PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Eiji ICHIHARA, et al.

Appln. No.: 10/524,262

Confirmation No.: 9895

Filed: September 6, 2005

Docket No: Q86135

Group Art Unit: 2855

Examiner: Gail Kaplan VERBITSKY

For: METHOD DEVICE AND RECORDING MEDIUM WHERE PROGRAM IS RECORDED, FORDECIDING RESIDUAL TRAVEL LIFE AND END LIFE OF RUN-FLAT TIRE THAT CONTINUES TRAVELING IN RUN-FLAT CONDITION

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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I. REAL PARTY IN INTEREST

The real party in interest is Bridgestone Corporation, the assignee of the present application. The assignment was recorded on September 6, 2005, at Reel 017496, Frame 0892.

II. RELATED APPEALS AND INTERFERENCES

Upon information and belief, there are no other prior or pending appeals, interferences or judicial proceedings known to Appellants' Representative or the Assignee that may be related to, be directly affected by, or have a bearing on the Board's decision in the Appeal.

III. STATUS OF CLAIMS

Claims 1, 2 and 6-13 are pending in the present application. Claims 1, 2, 6 and 11-13 stand finally rejected and are the subject of this Appeal. Claims 7-10 are objected to, but would otherwise be allowed if rewritten in independent form. Claims 3-5 and 14-21 have been canceled.

All of the claims pending in the present application are set forth in their entirety in Appendix A, attached to this Brief on Appeal.

IV. STATUS OF AMENDMENTS

Prior to the Final Office Action issued April 15, 2008, Appellants submitted an Amendment Under 37 C.F.R. § 1.111 on January 17, 2008. That Amendment was entered as a matter of right. Accordingly, there are no outstanding, non-entered amendments of the claims.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention relates to a process for judging the residual lifetime of a run-flat tire including predicting the end stage of the lifetime during continuous running at the run-flat state. (Abstract, Specification, p. 2, lines 20-26). Run-flat tires are tires developed to run over a certain distance even if the tire internal pressure is abnormally lowered by the occurrence of puncture. (Specification, p. 2, lines 8-16). In these sort of tires, it is important that the information on the residual lifetime and end stage of the run-flat tire during continuous running be quantitatively obtained. In this way, by predicting the time just prior to occurrence of trouble or failure of the run-flat tire, the safety of an operator can be ensured. (Specification, p. 2, lines 25-29).

Claim 1

Independent claim 1 recites a process for judging a residual lifetime of a run-flat tire 2 during continuous running at a run-flat state in a vehicle equipped with a run-flat tire system comprising run-flat tires 2 and detection units 4 each arranged in the respective tire and for measuring a temperature of the tire (Specification, p. 10, lines 13-20; FIG. 1), wherein when at least one run-flat tire 2 among the run-flat tires 2 is continuously run at the run-flat state by an abnormal lowering of an internal pressure (*See* Specification, p. 15, lines 21-31 through p. 16, lines 1-13; FIG. 3) the temperature of the run-flat tire continuously running at the run-flat state is measured, (Specification, p. 16, lines 14-26; FIG. 6) and a residual lifetime of the run-flat tire is judged based on the measured temperature (Specification, p. 16, lines 14-28; FIG. 8), wherein the residual lifetime is judged by a runnable time and/or distance calculated on the basis of the

measured temperature until a trouble state of the run-flat tire (Specification, p. 16, lines 24-26), wherein the temperature of the tire is an atmosphere temperature inside the tire (Specification, p. 15, lines 13-21), wherein after the previous setting of a limit temperature being statistically the occurrence of the trouble state when at least one run-flat tire among the run-flat tires is continuously run at the run-flat state by an extreme lowering of the internal pressure (Specification, p. 16, lines 27-33 and p. 17, lines 1-10) the atmosphere temperature inside tire is measured in the run-flat tire during the continuous running at the run-flat state (Specification, p. 15, lines 13-21) and a time predicted to reach to the limit temperature is calculated by using the measured values of the atmosphere temperature inside tire and data calculated from these measured values of the atmosphere temperature inside tire (Specification, p. 16, lines 21-24; FIG. 5)), and a calculated running time and/or running distance are rendered into a runnable time and/or distance up to the occurrence of the trouble state in the run-flat tire (Specification, p. 16, lines 24-26).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(1) Whether claims 1-2, 6 and 12-13 are patentable under § 103(a) in view of WO 01/17806 A1 (hereinafter '806) and Aubel et al. (US 6,921,197);

(2) Whether claim 11 is patentable under § 103(a) in view of WO 01/17806 A1 (hereinafter '806) and Aubel et al. (US 6,921,197), as applied to claims 1-2, 6 and 12-13 above, and in further view of Tanaka (US 6,701,986).

(3) Whether claims 1-2, 6 and 12-13 are patentable under § 103(a) in view of WO 01/17806 A1 in view of Nowicki et al. (US 5,945,908).

VII. ARGUMENT

Appellants respectfully request reconsideration of the present claim rejections in view of the comments presented below.

(1) Appellants respectfully submit claims 1-2, 6 and 12-13 are patentable under § 103(a) over WO 01/17806 A1 (hereinafter '806) in view of Aubel et al. (US 6,921,197).

The Examiner rejected claims 1-2, 6 and 12-13 under § 103(a) as being unpatentable over WO 01/17806 A1 (hereinafter WO '806) in view of Aubel et al. (US 6,921,197).

Claim 1 recites, *inter alia*, wherein after the previous setting of a limit temperature being statistically the occurrence of the trouble state when at least one run-flat tire among the run-flat tires is continuously run at the run-flat state by an extreme lowering of the internal pressure, the atmosphere temperature inside tire is measured in the run-flat tire during the continuous running at the run-flat state, and a time predicted to reach to the limit temperature is calculated by using the measured values of the atmosphere temperature inside tire and data calculated from these measured values of the atmosphere temperature inside tire, and a calculated running time and/or running distance are rendered into a runnable time and/or distance up to the occurrence of the trouble state in the run-flat tire.

In the rejection, the Examiner contends WO '806 discloses most of the features recited in the claims but concedes WO '806 fails to disclose that the driver would want to know the end life of the tire as a function of temperature. (*Final Office Action*, April 15, 2008, p. 2). To compensate for this deficiency, the Examiner applies Aubel contending it discloses embedding a temperature sensor in a tire, evaluating the condition of the tire with respect to the run time and

an integral of the output temperature. The integral being indicative of a wear signal such that when the integral exceeds a threshold level, the device indicates a wear signal for the tire. (*Office Action*. p. 2 - 3).

First, Appellants agree that WO '806 fails to disclose calculating a time to reach a limit temperature. Rather, WO '806 merely evaluates whether a change in temperature, "the rate," exceeds a predetermined value (p. 12, lines 30-33), or alternatively, whether a tire temperature exceeds a predetermined value "D." WO '806 does not disclose calculating a time predicted to reach the limit temperature as required by claim 1, but rather, it triggers an alarm only when the excessive temperature is reached.

Second, Appellants respectfully disagree with the Examiner's reading of Aubel. Rather, Aubel is directed to: (1) triggering a warning signal when a critical temperature is exceeded; and (2) calculating a time integral of temperature over time as a measure of tire damage. (col. 5, lines 15-25). No portion of Aubel discloses that a time predicted to reach a limit temperature is calculated. Aubel only discloses triggering an alarm when such a temperature is reached or evaluating the temperature over time to predict tire damage.

More specifically, Aubel fails to perform any time predictions. In the first case, Aubel triggers an alarm when a critical temperature is reached. In the second case, Aubel records an accumulation of damage that occurs when the tire temperature exceeds a temperature threshold T1. (col. 5, lines 44-61). As illustrated in FIG. 4, the temperature T of the tire is plotted over time. Only when the tire temperature T exceeds the threshold temperature T1 is the temperature integrated over time to accumulate the tire damage. (*See* FIG. 4 (shaded regions)). When the

integral of this curve exceeds a tire-dependent predetermined value, it is assumed the tire is potentially damaged and must be replaced. (col. 5, lines 58-61). There are no time predictions in either case here. In the first case, an alarm is instantaneously triggered when a certain temperature limit is reached, and in the second case, damage is merely calculated and accumulated based on past measurements. In neither case is a time predicted. Moreover, as evidenced in FIG. 4 of the second case, the temperature appears to meander above and below the T1 threshold. Because damage is only accumulated when the threshold T1 is exceeded, if the tire would run below T1 for extended periods, no further damage would be accumulated, and consequently, using this model the tire would run indefinitely. In this way, Aubel's time integration technique fails to predict a time to reach a limit temperature.

Thus, because WO '806 fails to disclose "a time predicted to reach to the limit temperature is calculated by using the measured values of the atmosphere temperature inside tire," and Aubel fails to compensate for this deficiency, Appellants submit that even if WO '806 and Aubel are combined as suggested, the suggested combination fails to disclose all the features recited in claim 1. Additionally, Appellants submit claims 2, 6 and 12-13 are allowable, at least by virtue of their dependency.

(2) Appellants respectfully submit claim 11 is patentable under § 103(a) in view of WO 01/17806 A1 (hereinafter '806) and Aubel et al. (US 6,921,197), as applied to claims 1-2, 6 and 12-13 above, and in further view of Tanaka (US 6,701,986).

Specifically, Appellants submit that because Tanaka fails to compensate for the above noted deficiencies of the WO '806 and Aubel combination as set forth above, even if combined

as suggested, the applied combination fail to disclose all the features of claim 1. Therefore, Appellants submit claim 11 is allowable, at least by virtue of its dependency.

Specifically, Tanaka relates to a run-flat tire with a tread reinforcing layer to improve running distance and cornering stability. No portion of Tanaka discloses measuring a temperature of the tire or predicting a time to reach a limit temperature. In this way, Appellants submit Tanaka fails to compensate for the above noted deficiencies of WO '806 and Aubel as applied to claim 1.

Thus, Appellants submit claim 11 is allowable for at least this reason.

(3) Appellants respectfully submit claims 1-2, 6 and 12-13 are patentable under § 103(a) in view of WO 01/17806 A1 in view of Nowicki et al. (US 5,945,908).

Claims 1-2, 6 and 12-13 stand under § 103(a) as being unpatentable over WO 01/17806 A1 in view of Nowicki et al. (US 5,945,908).

Again, in this rejection, the Examiner relies on WO '806 as teaching most of the features recited in claim 1, but concedes WO '806 fails to disclose all the features of claim 1. To compensate for these deficiencies, the Examiner applies Nowicki alleging it discloses a device which determines the expected tire life based on a tire temperature by comparing the parameters against previously stored parameters. (*Office Action*, p. 4).

Claim 1 recites, *inter alia*, wherein after the previous setting of a limit temperature being statistically the occurrence of the trouble state when at least one run-flat tire among the run-flat tires is continuously run at the run-flat state by an extreme lowering of the internal pressure, the atmosphere temperature inside tire is measured in the run-flat tire during the continuous running

at the run-flat state, and a time predicted to reach to the limit temperature is calculated by using the measured values of the atmosphere temperature inside tire and data calculated from these measured values of the atmosphere temperature inside tire, and a calculated running time and/or running distance are rendered into a runnable time and/or distance up to the occurrence of the trouble state in the run-flat tire.

In contrast, Appellants submit that neither WO '806 nor Nowicki discloses calculating a time predicted to reach a limit temperature. First, as set forth above, Appellants submit that WO '806 fails to disclose any such feature. Second, with regard to Nowicki, in the Response to Arguments section of the Final Office Action issued April 15, 2008, the Examiner contends:

> Nowicki teaches that expected tire life/ end stage/ residual life is dependent and could be calculated based on temperature and pressure. This would imply that Nowicki could predict/ calculate the time when the trouble could occur.
>
> (*Office Action*, p.6).

In contrast, Appellants submit the Examiner has misread Nowicki because this reference fails to predict a time to reach a limit temperature. Rather, while Nowicki calculates the accumulated aggregate tire damage resulting from tire temperature and/or pressure conditions or the expected tire life under current tire conditions, nowhere does Nowicki calculate a time predicted to reach a limit temperature. (col. 7, lines 24-29). Specifically, Nowicki calculates the actual tire damage based upon a comparison of time, speed, temperature, load, etc. (col. 8, lines 47-50). Nowicki merely uses the measured temperature (among many other variables) as an input to calculate actual tire damage, after such a temperature has been measured, but Nowicki fails to address any limit temperature or more specifically, predict a time to reach a limit temperature.

Consequently, because none of the applied reference disclose calculating a predicted time to reach a limit temperature, Appellants respectfully submit that even if combined as suggested, the applied combination fails to disclose all the features recited in claim 1. Additionally, Appellants submit claims 2, 6 and 12-13 are allowable, at least by virtue of their dependency.

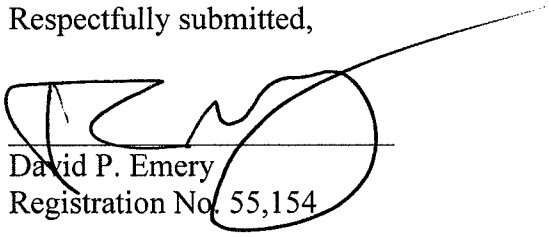
Conclusion

For at least the reasons set forth above, Appellants submit that the outstanding rejections are in error and reversal is respectfully requested.

Unless the fee required under 37 C.F.R. §41.37(a) and 1.17(c), is submitted via EFS Payment Screen, please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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Date: July 15, 2008

CLAIMS APPENDIX

CLAIMS 1, 2, and 6-13 ON APPEAL:

1. A process for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state in a vehicle equipped with a run-flat tire system comprising run-flat tires and detection units each arranged in the respective tire and for measuring a temperature of the tire, wherein when at least one run-flat tire among the run-flat tires is continuously run at the run-flat state by an abnormal lowering of an internal pressure, the temperature of the run-flat tire continuously running at the run-flat state is measured, and a residual lifetime of the run-flat tire is judged based on the measured temperature,

wherein the residual lifetime is judged by a runnable time and/or distance calculated on the basis of the measured temperature until a trouble state of the run-flat tire,

wherein the temperature of the tire is an atmosphere temperature inside the tire,

wherein after the previous setting of a limit temperature being statistically the occurrence of the trouble state when at least one run-flat tire among the run-flat tires is continuously run at the run-flat state by an extreme lowering of the internal pressure, the atmosphere temperature inside tire is measured in the run-flat tire during the continuous running at the run-flat state, and a time predicted to reach to the limit temperature is calculated by using the measured values of the atmosphere temperature inside tire and data calculated from these measured values of the atmosphere temperature inside tire, and a calculated running time and/or running distance are rendered into a runnable time and/or distance up to the occurrence of the trouble state in the run-flat tire.

2. A process for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state according to claim 1, wherein the residual lifetime is judged on the basis of the increasing of the measured temperature.

6. A process for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state according to claim 1, wherein after a relationship of the atmosphere temperature inside tire T to be measured with respect to a continuously running time t is previously determined as a function f(t) under various run-flat running conditions, when the run-flat tire is continuously run at the present run-flat running condition from a time point of measuring the atmosphere temperature inside tire, the running time and/or the running distance predicted to reach to the limit temperature are calculated by using the function f(t).

7. A process for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state according to claim 6, wherein the function f(t) is approximately expressed by $f(t) = T_0-Aexp(-Bt)$, wherein T_0 is a predicted saturation reaching temperature and A and B are coefficients, and when the run-flat tire is continuously run at the present run-flat running condition from a time point of measuring the atmosphere temperature inside tire, the running time and/or the running distance predicted to reach to the limit temperature are calculated by using the function f(t).

8. A process for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state according to claim 7, wherein the coefficient B is a constant value, and the coefficient A and the predicted saturation reaching temperature T_0 are calculated from the measured temperature and a rate of temperature change thereof per unit time, and when the run-flat tire is continuously run at the present run-flat running condition from a time point of measuring the atmosphere temperature inside tire, the running time and/or the running distance predicted to reach to the limit temperature are calculated by using the function f(t) and substituting the calculated values therefor.

9. A process for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state according to claim 8, wherein the function f(t) differs bordering a transition temperature which is a given temperature lower than the limit temperature, and is approximately expressed by $f(t) = T_0\text{-}A\exp(-Bt)$, wherein T_0 is a predicted saturation reaching temperature and A and B are coefficients when the atmosphere temperature inside tire is a temperature region lower than the transition temperature, and a case that the predicted saturation reaching temperature T_0 is lower than the transition temperature is judged as a safety mode capable of continuously running at the run-flat state over a long time, and a case that the predicted saturation reaching temperature T_0 is higher than the transition temperature is judged as a danger mode of predicting the occurrence of the trouble state during continuous running at the run-flat state, and when the run-flat tire is continuously run at the present run-flat running condition from a time point of measuring the atmosphere temperature inside tire, the running time and/or the

running distance predicted to reach to the limit temperature are calculated by using the function f(t).

10. A process for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state according to claim 9, wherein the function f(t) is approximately expressed by $f(t) = T_1+Ct$, wherein T_1 is a measured temperature and C is a change ratio of temperature measured per unit time, and when the run-flat tire is continuously run at the present run-flat running condition from a time point of measuring the atmosphere temperature inside tire, the running time and/or the running distance predicted to reach to the limit temperature are calculated by using the function f(t).

11. A process for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state according to claim 1, wherein the run-flat tire is a so-called side-reinforced run-flat tire in which a reinforcing rubber is arranged on at least a sidewall portion of the tire at an inner surface side thereof.

12. A record medium recording a program for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state, in which the program is recorded to conduct the process according to claim 1with a computer.

13. An apparatus for judging a residual lifetime of a run-flat tire during continuous running at a run-flat state by conducting the process according to claim 1, which comprises detection units arranged in the respective run-flat tires and capable of measuring at least an atmosphere temperature inside tire in these tires, calculation means for at least calculating a running time and/or a running distance predicted to reach to the limit temperature from the measured value of the atmosphere temperature inside tire when the run-flat tire is continuously run at the present run-flat running condition, and memory means for at least memorizing basic data to be compared with data calculated by the calculation means.

EVIDENCE APPENDIX:

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

NONE.

RELATED PROCEEDINGS APPENDIX

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).

NONE.

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SUBMISSION OF APPEAL BRIEF

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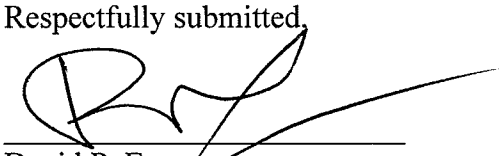
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. The statutory fee of $510.00 is being charged to Deposit Account No. 19-4880 via EFS Payment Screen. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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